



UNITED STATES PATENT AND TRADEMARK OFFICE

c/c

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,514	02/28/2002	Christoph Gurtler	Mo6801/LeA 34,953	8714

157 7590 06/02/2005

BAYER MATERIAL SCIENCE LLC
100 BAYER ROAD
PITTSBURGH, PA 15205

EXAMINER

PUTTLITZ, KARL J

ART UNIT	PAPER NUMBER
----------	--------------

1621

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/085,514

Applicant(s)

GURTLER ET AL.

Examiner

Karl J. Puttlitz

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/16/2005 has been entered.

The rejections under section 103 are maintained and repeated below.
Applicant's remarks in connection with these grounds of rejection are also addressed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 11-21 and are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,580,947 to Brahm et al. (Brahm).

The claims recite, *inter alia*:

A process for preparing a polyisocyanate containing acylurea groups which comprises reacting an isocyanate corresponding to formula (I)



wherein R represents an n-valent linear or branched aliphatic group or cycloaliphatic group having 4 to 30 carbon atoms or an aromatic group having 6 to 24 carbon atoms and n is 1, 2, 3 or 4,

with an aliphatic, cyclic and/or aromatic carboxylic acid in the presence of a metal-salt catalyst at a temperature of 20 to 220 °C. See claim 1.

The claims are also drawn to the products of this reaction, see claim 11.

In examples 1 to 3, Brahm teaches a process wherein "x equivalents of the isocyanate component ... and y equivalents of the dehydrated carboxylic acid component were added dropwise at 150°C within 3 to 4 hours." See column 6, lines 34-45.

Brahm teaches a catalysts at column 5, lines 9-16, e.g., "metal salts such as iron-(III) chloride or potassium octoate, tin compounds (such as tin-(II)-octoate, tin-(II)-ethylhexanoate, tin-(II)-laurate, aluminium-tri(ethylacetoacetate), dibutyl tin oxide, dibutyl tin dichloride, dibutyl tin diacetate, dibutyl tin dilaurate, dibutyl tin maleate or dioctyl tin diacetate) and mineral acids (such as sulphuric acid, hydrochloric acid, phosphoric acid and perchloric acid)." See column 5, lines 9-16.

Representative isocyanates: "Isocyanate component a) is selected from a1) isophorone diisocyanate or mixtures of isophorone diisocyanate with a2) other organic polyisocyanates which are present in quantities of up to 60% by weight, preferably up to 40% by weight and more preferably up to 30% by weight, based on the total weight of component a). . . . Starting isocyanates a2) have an isocyanate content of 10 to 60% by

Art Unit: 1621

weight and include aliphatic and cycloaliphatic diisocyanates such as 1,4-diisocyanatobutane, 1,5-diisocyanatopentane, 1,6-diisocyanatohexane (HDI), dodecamethylene diisocyanate, undecane diisocyanate, 2,2,4-trimethylhexane diisocyanate, 1,3-cyclopentylene diisocyanate, cyclohexane-1, 3- and 1,4-diisocyanate, the isomeric diisocyanato dicyclohexylmethanes, 2,5- and 2,6-bis(isocyanatomethyl)bicyclo-[2.2.1]-heptane, isocyanatomethyl-1-methylcyclohexyl-isocyanate (IMCI), 1,4- and 1,3-di(isocyanatoisopropyl)-cyclohexane and xylene diisocyanate; diisocyanates containing aromatically bound isocyanate groups such as 2,4-diisocyanatotoluene and/or 2,6-diisocyanatotoluene, the isomeric diisocyanatodiphenylmethanes and higher homologues, 1,3-phenylene diisocyanate, 1,4-phenylene diisocyanate, 4,4'-biphenylene diisocyanate, 1,5-naphthylene diisocyanate, 1,4-naphthylene diisocyanate and 4,4'-diisocyanatodiphenylether; and mixtures of the preceding isocyanates... . Starting isocyanates a2) also include modification products of the above-mentioned diisocyanates containing biuret, uretdione, isocyanurate, allophanate and/or carbodiimide groups. Monofunctional isocyanates may also be used to obtain special properties, but are not preferred." See column 3, lines 13-42.

Representative carboxylic acids are "carboxylic acids having a molecular weight of 46 to 600, preferably 60 to 300. Both monobasic and polybasic carboxylic acids may be used. Examples include formic acid, acetic acid, the isomeric propanoic acids, butanoic acids, pentanoic acids, hexanoic acids, heptanoic acids, octanoic acids, nonanoic acids, decanoic acids, dodecanoic acids, tetradecanoic acids, hexadecanoic

Art Unit: 1621

acids, octadecanoic acids, eicosanoic acids, docosanoic acids, tetracosanoic acids, dicarboxylic acids such as maleic acid, fumaric acid, malonic acid, adipic acid, sebacic acid, dimeric products of the unsaturated fatty acids b1), tricarboxylic acids [such as trimellitic acid, citric acid and trimeric products of the unsaturated fatty acids b1)], tetracarboxylic acids such as benzene tetracarboxylic acid, and mixtures of the preceding carboxylic acids." See column 4, lines 23-36.

Brahm also teaches compositions which can be used as binders. See column 6, lines 18-24.

The difference between Brahm and the rejected claims is that Brahm does not teach the invention recited in the rejected claims with sufficient particularity to amount to anticipation (See M.P.E.P. 2131: a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001).

Brahm teaches specific carboxylic acid reagents, for example, at column 4, lines 22-36, which includes dodecanoic acid.

However, Brahm does teach the elements of the claimed invention with a reasonable expectation of success. Therefore, one of ordinary skill would find the invention of the rejected claims *prima facie* obvious in view of Brahm.

With regard to product by process claim 11, the examiner notes that Brahm teaches the recited polyisocyanate. "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) See M.P.E.P. § 2113.

Response to Arguments

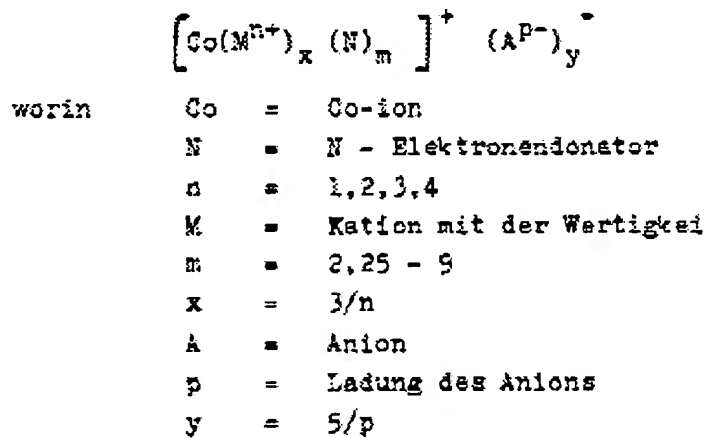
Applicant argues that Brahm teaches a process for making olefinically unsaturated isocyanates which are substantially free of acylurea (col.2, line 66). However, the reference teaches that some products (i.e., few) do contain acylurea. Applicant's remarks regarding equimolar amounts of reactants are not given any weight since this aspect is not recited in the claims.

Applicant also argues that the use of a metal salt catalyst has surprisingly been found to permit the attainment of colorless polyisocyanates having no acylurea groups. The examiner submits that Brahm teaches the claims metal salt catalyst and that any characteristic (i.e., color) in the final product polyisocyanate is a necessary aspect of the process of Brahm since Brahm substantially teaches the elements of the claimed process.

Art Unit: 1621

With regard to Applicant's comments regarding the use metal catalysts that impart colorless properties to the polyisocyanates, this argument is given little weight since those metal catalysts that are not taught by Brahm and impart these properties are not specified by the claims.

In this regard, Brahm mentions that the catalysts taught in DE 4032546 may be used. The first page of this patent is attached, showing the recited metal salt catalysts:



Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 3,970,600 to Falkenstein et al. (Falkenstein) in view of Brahm.

A description of the claimed invention is given supra.

Falkenstein teaches "a process for the production of stable, liquid solutions of isocyanurate-polyisocyanates containing amide and/or acylurea groups... wherein monomeric diisocyanates and/or polyisocyanates are modified with aliphatic and/or

aromatic dicarboxylic acids ...[and] the resulting diisocyanates and/or polyisocyanates [contain] amide and/or acylurea groups" See column 2, lines 32-47.

Example 3 features the process using phthalic acid. The examples also feature the use of adipic acid.

Representative isocyanates are: "aliphatic, cycloaliphatic, aliphatic-cycloaliphatic, araliphatic, cycloaliphatic-aliphaticaromatic and aromatic diisocyanates and/or polyisocyanates. In some cases it is desirable to add to the diisocyanates and/or polyisocyanates aliphatic, cycloaliphatic and/or aromatic monoisocyanates in amounts corresponding to from 0.01 to 0.5, preferably from 0.05 to 0.2 mole of monoisocyanate per mole of the diisocyanate and/or polyisocyanate in the isocyanate mixture. The diisocyanates and/or polyisocyanates containing amide and/or acylurea groups which have been produced in this way are of relatively low viscosity. Examples of suitable monoisocyanates are methylisocyanate, propylisocyanate, pentylisocyanate, cyclohexylisocyanate and phenylisocyanate. Examples of suitable diisocyanates are aliphatic diisocyanates, such as 1,6-hexamethylenediisocyanate, 1,10-decanediisocyanate and 1,12-dodecanediisocyanate, cycloaliphatic diisocyanates, such as 1,3- or 1,4-cyclohexanediisocyanate, 1-methylcyclohexane-2,4- and 2,6-diisocyanate and 3-isocyanatomethyl-3,5,5-trimethyl-cyclohexylisocyanate, araliphatic diisocyanates, such as cycloaliphatic-aliphatic-aromatic diisocyanates, e.g. 4-cyclohexyl-4'-phenylmethanediisocyanate, and aromatic diisocyanates, such as 1,3- and 1,4-phenylenediisocyanate, 2,4- and 2,6-toluylene-diisocyanate, naphthalene-1,5-diisocyanate and 2,4'-, 2,2'- and/or 4,4'-diphenylmethanediisocyanate. Examples of

Art Unit: 1621

suitable polyisocyanates are 2,4,6-toluylenetriisocyanate, triphenylmethane-4,4',4''-triisocyanate and the polyphenyl-polymethylenepolyisocyanates obtained by condensation of aniline and/or halogen-substituted or alkyl-substituted anilines with formaldehyde, followed by phosgenation. The diisocyanates and/or polyisocyanates can be used individually or as mixtures. The use of the commercially available products 2,4- and 2,6-toluylenediisocyanates or of mixtures consisting of these isomers, 4,4'-, 2,4'- and/or 2,2'-diphenylmethane-diisocyanate and polyphenyl-polymethylene-polyisocyanates or mixtures of these isocyanates is preferred." See columns 3 and 4.

Finally, Falkenstein teaches the utility of the disclosed products in the manufacture of polyurethane coatings. Specifically, that "[t]he stable, liquid solutions according to the invention, which contain isocyanurate-polyisocyanates containing amide and/or acylurea groups can be used to manufacture polyurethanes. They are particularly suitable for the manufacture of polyurethane surface coatings, polyurethane adhesives and polyurethane foams of increased load-bearing capacity and improved flame-resistance.

The difference between the rejected claims and the disclosure of the Falkenstein is that the rejected claims additionally recite a metal-salt catalyst, and specific carboxylic acid. In this connection, Brahm teaches specific carboxylic acid reagents, for example, at column 4, lines 22-36, which includes dodecanoic acid.

In addition, Brahm teaches these catalysts in connection with reactions of isocyanates and carboxylic acids. In particular, Brahm teaches catalysts that are "metal salts such as iron-(III) chloride or potassium octoate, tin compounds (such as tin-

(II)-octoate, tin-(II)-ethylhexanoate, tin-(II)-laurate, aluminium-tri(ethylacetoacetate), dibutyl tin oxide, dibutyl tin dichloride, dibutyl tin diacetate, dibutyl tin dilaurate, dibutyl tin maleate or dioctyl tin diacetate) and mineral acids (such as sulphuric acid, hydrochloric acid, phosphoric acid and perchloric acid)." See column 5, lines 9-16.

Furthermore Brahm teaches that by using these catalysts, the reaction may be accelerated. Accordingly, it would have been *prima facie* obvious to one of ordinary skill to modify the disclosure of Falkenstein by adding metal salt catalysts because Brahm teaches that using these catalysts will accelerate the reaction.

With regard to product by process claim 11, the examiner notes that the applied references teach the recited polyisocyanate. See M.P.E.P. § 2113 "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,616,061 to Henning et al. (Henning) in view of Brahm.

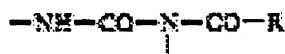
A description of the claimed invention is given supra.

Art Unit: 1621

Henning teaches, *inter alia*, a process for the production of such solutions or dispersions by reacting (a) organic polyisocyanates, optionally in combination with the organic monoisocyanates with (b) isocyanate-reactive group-containing compounds, optionally in the presence of (c) further auxiliaries and additives." See column 2, lines 43-49.

Henning teaches the following isocyanate reagents: "Q(NCO)₂, wherein Q represents an aliphatic hydrocarbon radical having 4 to 12 carbon atoms, a cycloaliphatic hydrocarbon radical having 6 to 15 carbon atoms, an aromatic hydrocarbon radical having 6 to 15 carbon atoms or an araliphatic hydrocarbon radical having 7 to 15 carbon atoms. The following are examples of such diisocyanates which are preferably used: tetramethylene diisocyanate, hexamethylene diisocyanate, dodecamethylene diisocyanate, 1,4-diisocyanatocyclohexane, 1-isocyanato-3,3,5-trimethyl-5-isocyanatomethylcyclohexane, 4,4'-diisocyanato-dicyclohexylmethane, 4,4'-diisocyanatodicyclohexylpropane-(2,2), 1,4-diisocyanatobenzene, 2,4-diisocyanatotoluene, 2,6-diisocyanatotoluene, 4,4'-diisocyanatodiphenylmethane, 4,4'-diisocyanatodiphenylpropane-(2,2), p-xylylene-diisocyanate or .alpha.,.alpha.,.alpha.',.alpha.'-tetramethyl-m- or p-xylylenediisocyanate, and mixtures thereof."

In particular, Henning makes mention of isocyanates containing acylureas of the following formula:



See column 4, lines 4-11.

Representative carboxylic acids are: "acetic acid, propionic acid, *hexane carboxylic acid*, lauric acid, palmitic acid, stearic acid, benzoic acid, phenylacetic acid, acrylic acid, methacrylic acid, crotonic acid, 10-undecanoic acid, oleic acid or linoleic acid. It is also possible, in principle, to use other monocarboxylic acids in the process according to the present invention which do not correspond to the aforementioned definition of R such as chloroacetic acid, cyclohexane carboxylic acid, abietic acid, 4-dimethylaminobenzoic acid or monoesters or monoamides of dicarboxylic acids such as oxalic acid, malonic acid, succinic acid, maleic acid, fumaric acid or *phthalic acid* with monohydric alcohols or amines." See column 5, lines 9-23 [emphasis applied].

The difference between the rejected claims and the disclosure of the Henning is that the rejected claims additionally recite a metal-salt catalyst. However, Brahm teaches these catalysts in connection with reactions of isocyanates and carboxylic acids. In particular, Brahm teaches catalysts that are "metal salts such as iron-(III) chloride or potassium octoate, tin compounds (such as tin-(II)-octoate, tin-(II)-ethylhexanoate, tin-(II)-laurate, aluminium-tri(ethylacetoacetate), dibutyl tin oxide, dibutyl tin dichloride, dibutyl tin diacetate, dibutyl tin dilaurate, dibutyl tin maleate or dioctyl tin diacetate) and mineral acids (such as sulphuric acid, hydrochloric acid, phosphoric acid and perchloric acid)." See column 5, lines 9-16.

Furthermore Brahm teaches that by using these catalysts, the reaction may be accelerated. Accordingly, it would have been *prima facie* obvious to one of ordinary skill

Art Unit: 1621

to modify the disclosure of Henning by adding metal salt catalysts because Brahm teaches that using these catalysts will accelerate the reaction.

With regard to product by process claim 11, the examiner notes that the applied references teach the recited polyisocyanate. See M.P.E.P. § 2113 "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

With regard to the foregoing combinations of Falkenstein or Henning with Brahm, applicant argues that Brahm cannot be combined with the secondary references, Faulkenstein or Henning, to arrive at the present invention. Specifically, Brahm teaches a different product. None of the references provide the missing teaching, namely how to solve the problem of making polyisocyanates having acylurea groups colorless. The use of a metal salt catalyst, as recited in claim 1, solves this problem. Therefore, the present invention is not obvious in view of Brahm, either alone or combined with Faulkenstein or Henning.

However, as stated above, Brahm does indicate that the desired product with acyl urea may be formed. The instant claims do not require purity. In addition, the claimed catalysts are incorporated by Brahm (See description of DE 4032546, above)

Finally, motivation to combine the references is given above, which need not require applicant's motivation. See M.P.E.P. § 2144 ("The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972) (discussed below); *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 U.S. 904 (1991) (discussed below). Although *Ex parte Levengood*, 28 USPQ2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) states that obviousness cannot be established by combining references "without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done" (emphasis added), reading the quotation in context it is clear that while there must be motivation to make the claimed invention, there is no requirement that the prior art provide the same reason as the applicant to make the claimed invention.").

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-

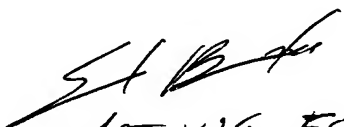
Art Unit: 1621

0645. The examiner can normally be reached on Monday to Friday from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter, can be reached at telephone number (571) 272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Karl J. Puttlitz
Assistant Examiner


ACTING FOR
Johann R. Richter, Ph.D., Esq.
Supervisory Patent Examiner
Biotechnology and Organic Chemistry
Art Unit 1621
(571) 272-0646